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Proposals for the Future Development of the Russian Automated Federal Information System for Nuclear Material Control and Accounting: The Universal Reporting Concept

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Proposals for the Future Development of the Russian Automated Federal Information System for Nuclear Material Control and Accounting: The Universal Reporting Concept

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Abstract

Development of the automated Russian Federation Federal Information System for Nuclear Material Control and Accounting (FIS) started in 1996. From the beginning, the creation of the FIS was based on the concept of obtaining data from the material balance areas of the organizations, which would enable the system to collect detailed information on nuclear material. In December 2000, the organization-level summarized reporting method was mandated by the Russian Federation and subsequently implemented for all organizations. Analysis of long-term FIS objectives, reporting by all the MBAs in Russia, showed that the present summarized reporting approach decreed by regulations posed a fair number of problems. We need alternative methods that allow the FIS to obtain more detailed information on nuclear material but which accurately reflect the technical and economic resources available to Russian organizations. One possible solution is the universal reporting method. In August 2003, the proposals of the FIS working group to transition to the universal reporting method were approved at the fourth meeting of the Joint Coordinating Committee for Implementation of the Russian Federation and U.S. Government-to-Government Agreement on Cooperation in the Area of Nuclear Material Physical Protection, Control and Accounting (JCC). One of the important elements of universal reporting is that organizations handling nuclear material will establish "reporting areas" in cooperation with MinAtom of Russia. A reporting area may consist of one MBA, several MBAs, or even an entire organization. This paper will discuss the universal reporting concept and its major objectives and methods for the FIS.

I. The Automated Federal Nuclear Material Control and Accounting System of the Russian Federation

In accordance with the basic guidelines of the Russian State System for Nuclear Material Accounting and Control (SSAC), the Federal Agency for Atomic Energy (formerly Ministry of Atomic Energy) is creating and operating the automated Federal Information System for State Nuclear Material Control and Accounting (FIS). The objective in developing the FIS is to provide information support for the state control, accounting and management of nuclear material.

The major tasks of the FIS include:

- Collecting information related to the state control, accounting and management of nuclear material (excluding nuclear material used for the purposes of defense);
- Providing output information to FIS users.

The FIS, which is designed to control and account for nuclear material located at Russian Federation enterprises and organizations,has been in development since 1996. During the period of the FIS development, the FIS has received support from Lawrence Livermore National Laboratory (LLNL) and the U.S. Department of Energy (DOE) within the framework of the Russian Federation and U.S. Government-to-Government Agreement

of Cooperation in the Area of Nuclear Material Physical Protection, Control and Accounting (MPC&A).

II. The Full Function Reporting Method

Initially, the basic concept for the FIS was to collect data from material balance areas (MBAs) at the organizations. The developers of the system thought this method for reporting information to the FIS would provide the most complete data about the nuclear material located at the organizations, including any changes in the inventory or shipments of nuclear material within or between the organizations. To support the implementation of this method ("the full function reporting method") the appropriate report forms, software and operating documents were developed.

MBAs started reporting to the FIS individually and in stages. This process was based on contracts signed with LLNL organizationand the use of hardware and software developed at the organizations. However, despite American-Russian joint efforts to facilitate the adoption of this method, since 1996, only slightly more than 50 MBAs from 20 organizations (of the approximately 60 Russian organizations that handle nuclear material).

III. The Summarized Reporting Method

By the end of the 1990s, the FIS development team realized that full function reporting method by MBAs could not be implemented at all Russian organizations, i.e., a "federal" information system in the true sense of the word could not be created.

To provide a system that would include all the nuclear organizations in Russia without exception, a reporting method was proposed in which reports would be submitted from the entire organization. The Russian Government officially approved this proposal at the end of 2000, when it adopted the "Regulation on State Nuclear Material Control and Accounting," which establishes organization-level reports as the basic method for reporting to the State System of Accounting and Control.

Pursuant to this regulation, the developers of the FIS created an additional set of report forms for the organizations. These forms were adopted by MinAtom, registered with the Ministry of Justice, and mandated for all Russian organizations that handle nuclear material. Organizations also continued using the full function reporting method to track information on MBAs already connected to the FIS.

Since 2002, the FIS has been receiving and processing two different types of nuclear material data:

- Information on specific MBAs of organizations included agreements for the full function reporting method;
- Information on the entire organization.

The FIS has also implemented data processing procedures to eliminate redundant organization data.

IV. Expediting the Development of the FIS and Problems with the Current Reporting Methods

In 2003, the Russian FIS development team and LLNL specialists examined different options for expediting the development of the FIS, as well as collecting information more efficiently in order to resolve nuclear material management, security and non-proliferation issues.

The analysis of the prospect to implement the long-term plan for the development of the FIS has shown, because of organizational and technical reasons, there is no possibility of a fast

transition to receiving reports from all MBAs in the country. At the same time, it became apparent that in certain circumstances the MBA level reports provided a greater level of detail than necessary, while the organization-wide reports provided too little information to perform several different nuclear material management tasks.

Alternative methods are needed to obtain more detailed information on nuclear material from all Russian organizations based on their technical and economic resources.

V. The Universal Reporting Method

Based on experience of gained from full function reporting and organization level summarized reports, as well as knowledge of foreign nuclear material control and accounting systems, including the U.S. Nuclear Materials Management and Safeguards System (NNMSS), the development team decided the universal reporting method is the best solution.

Universal Reporting combines material balance areas into reporting zones based on a specific set of rules. Forms for reporting from these zones will be derived from the existing FIS reporting forms.

Organizing MBAs into the reporting zones and summarizing information within these zones will allow the FIS to accomplish the following objectives:

1) Receive information in a manner that provides the optimum level of detail without superfluous or redundant data;

2) Maximize the use of the previous reporting methods and forms using existing FIS hardware and software.

VI. General Provisions for the Universal Reporting Method

The basic provisions of the universal reporting method are:

Organizations with nuclear material will establish “reporting zones” in coordination with Federal Agency for Atomic Energy.

A reporting zone may consist of a single MBA, several MBAs, or even an entire organization. Each organization, following specific rules and recommendations, will establish the appropriate number of reporting zones. During this process, the organizations will have to consider a number of organizational and technical issues, including the fact that certain of their material balance areas already report to the FIS. The Federal Agency for Atomic Energy will consider the material management needs of organizations in establishing the new reporting zones.

1. The reporting period will depend on the category of the MBAs integrated into the reporting zone. It is natural, that MBA with the highest category will determine periodicity of the reporting from the reporting zone. The reports submitted to the FIS will include:

- The inventory listing (submitted monthly, quarterly, semi-annually or annually – it depends on the category of the MBAs in the reporting zone);
- The inventory change report (submitted when a change occurs or according to an established schedule).

In all likelihood, we will have to revise the existing report forms so they can be adapted for the universal reporting method. However, maintaining the continuity of the forms as well as the coding system used with the current reporting methods is a primary goal in developing the universal reporting method.

2. To the greatest extent possible, the FIS will use the existing mechanisms of data collection and processing, although the system may require some modifications.

Rules for creating reporting zones will be developed by the Federal Agency for Atomic Energy (FAAE). The basic guidance is to create reporting zones on the logical business boundaries of an organization.

VII. Benefits from Implementation of the Universal Reporting Method

Advantages of a universal method are visible on the next example. A certain organization carries out enrichment of uranium. It also makes low enrichment uranium (LEU) within the framework of the Russian-American agreement (Contract HEU-LEU).

At this organization there are:

- A storage facility for natural uranium (UF6)- MBA 1, category 4
- A storage facility for depleted uranium - MBA 2, category 4
- A plant for the enrichment of uranium - MBA 3, category 4
- A storage facility for LEU - MBA 4, category 4
- A central laboratory - MBA 5, category 3
- A storage facility for high enriched uranium (HEU)- MBA 6, category 1
- An installation for the mixing of the natural uranium and HEU - MBA 7, category 1.

Under the full function reporting scheme the reports to the FIS are sent from each MBA. Thus from MBA 1, 2, 3, 4 Inventory Listings (ILs) are sent once a year, from MBA 5 – ILs are sent once each half year, from MBAs 6 and 7 – ILs are sent once a month. In total the organization represents 30 ILs per one year. Reports on change of inventory (ICR) are sent on each instance of change.

Under the summarized reporting scheme Summarized Inventory Listing (SIL) representing the entire organization's inventory is sent from all organizations to the FIS once a year. Summarized Inventory Change Reports (SICRs) are sent to FIS once each quarter also from all organizations as a whole.

Under the universal scheme of reporting, in coordination with FAAE, the organization will create the following reporting zones (RZ):

I RZ - MBAs 1, 2, 3, 4

II RZ - MBA 5

III-RZ - MBAs 6 and 7.

The organization will send:

From I RZ - ILs once a year and ICRs – quarterly or as the change occurs.

From II RZ - ILs semi-annually and ICRs – quarterly or as the change occurs.

From III RZ -ILs once a month and ICRs – monthly or as the change occurs.

In total, the organization will send to FIS 15 IL reports per one year, which is half the number as in the full function scheme. In result FAAE will receive the most full information on the most attractive material to accomplish their non-proliferation and material management functions, and the organizations will not be overloaded with excessive quantity of reports, which are necessary for sending to FIS.

VIII. Priorities for the Implementation of the Universal Reporting Method

In August 2003, the Russian Federation and U.S. FIS development team presented the major principles of the universal reporting method at the fourth meeting of the Joint Coordinating Committee for Implementation of the Russian Federation and U.S. Government-to-Government Agreement on Cooperation in the Area of Nuclear Material Physical Protection, Control and Accounting (JCC). The JCC approved the proposals of the FIS working group.

The developers, managers and users of the FIS must take the following steps to implement the universal reporting method:

1. Develop a conceptual design for the universal reporting method, which must then be approved at the management level of the Federal Agency for Atomic Energy.
2. Review the applicable regulations and other documents, including the "Regulation on State Nuclear Material Control and Accounting" and the "FIS Development Program."
3. Implement the universal reporting forms.
4. Modify the structure of the FIS, as necessary.
5. Sign agreements with organizations that handle nuclear material to establish the new reporting zones. We should emphasize again that the reporting zones are not structural units, but only an organizational tool for reporting to the FIS.

Conclusion

In our opinion, as a result of the above measures, at the beginning of 2006 the FIS will be able to start processing and using information received via the universal reporting method. This time frame depends, however, on the completion of the planned milestones in an efficient and timely manner.

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